HYDRAULIC AND ENERGY GRADE LINE CALCULATION WORKSHEET

Land user _____ Field Office _____
Job description _____
Location _____
Planner _____ Date _____ Checked by _____ Date _____

Friction loss calculation method:

Hazen Williams (C) _____ Mannings (n) _____
Darcy-Weisbach _____ Blasius/Darcy-Weisbach _____

ENERGY GRADE AT BEGINNING OF LINE

If there is pressure at inlet:

Pressure at beginning of pipeline_____ psi
Pressure head: hp = _____ psi x 0.433 = _____ ft
Elevation at pipe entrance _____ ft
Energy grade line elevation at entrance = hp + Elevation = _____

Gravity system:

Water surface elevation = energy grade line elevation at entrance_____ ft

PIPE FRICTION LOSS

Pipe segment identification				
Type/class of pipe				
Nominal pipe diameter in.				
Pipe inside diameter in.				
Number of discharge segments (N)				
Segment length (L) ft.				
Design flow rate (Q) gpm				
Friction coefficient (C or n)				
Flow Area (A) sq. ft.				
Velocity in pipe (V) = Q/448.8A ft/sec.				
Velocity head (hv) = $V^2/2g$ ft.				
Friction loss (J) ft/100ft.				
Reduction coefficient to compensate for N discharges				
Head loss due to pipe friction (hf)ft.				

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MINOR LOSSES

Pipe segment identification				

Coefficients (K):

Entrance				
Bends				
Valves				
Enlargement				
Contraction				
TOTAL K coefficients				
Total minor losses hm = K ($V^2/2g$) ft				

SEGMENT ENERGY/HYDRAULIC ELEVATIONS

At beginning of segment:

Energy grade line elevation = $*E_{beg}$				
Hydraulic grade line elevation = $*E_{beg} - hv$				

At ending of segment:

Energy grade elevation: $*E_{end} = *E_{beg} - hf - hm$				
Hydraulic grade line elevation = $*E_{end} - hv$				

$*E_{beg}$ and E_{end} is the energy grade line elevation at the beginning and end of the segment.